JESUP'S MILK-VETCH (*Astragalus robbinsii* var. *jesupii*)

SPOTLIGHT SPECIES ACTION PLAN

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Date

U.S. FISH AND WILDLIFE SERVICE - SPOTLIGHT SPECIES ACTION PLAN

Common Name: Jesup's milk-vetch

Scientific Name: *Astragalus robbinsii* var. *jesupii*

Lead Region: Northeast Region

Lead Field Office: New England Field Office

Species Information:

Status: Endangered

Recovery Priority Number: 6

Recovery Plan: Jesup's Milk-Vetch (*Astragalus robbinsii* var. *jesupii*) Recovery Plan, issued November 21, 1989

Most Recent 5-year Review: September 2009

Other: Fiscal Year 2007 Brink of Extinction Action Plan for Jesup's Milk-Vetch

Threats: Jesup's milk-vetch (JMV) is an endemic species restricted to three locations on the banks of the Connecticut River in New Hampshire and Vermont. The two principal threats to JMV are: (1) Invasive plant species altering the habitat or out-competing JMV for suitable habitat, and (2) the potential for climate change to adversely affect JMV habitat. Habitat suitability is being significantly altered by the invasion of native and non-native plant species. Black swallowwort (*Cynanchum louiseae*), shrubby honeysuckle (*Lonicera morrowii*), cypress spurge (*Euphorbia cyparissias*), and purple loosestrife (*Lythrum salicaria*) have been documented at one or more sites since 1997 (Cairns 2007, Farnsworth 2008). With respect to the potential threat from climate change, unusual flooding events (record flood levels reported during June and July of 2006)[1] and lack of ice-scour in recent years may be indicative of changing regional weather patterns. JMV plants, and especially seedlings, are particularly vulnerable to drought as well (Farnsworth 2008).

Another potential threat that has not yet been thoroughly investigated is the lack of genetic diversity that may be resulting in reduced vigor of the species. This may occur if the three populations decline in number to the point that genetic exchange is significantly

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[1] Data taken from the following U.S. Geological Survey website: http://nwis.waterdata.usgs.gov/nh/nwis/monthly/?referred_module=sw&site_no=01154500&por_01154500_2=1268930,00060,2,1942-03,2007-09&start_dt=1990-05&end_dt=2007-08&format=html_table&date_format=YYYY-MM-DD&rdb_compression=file&submitted_form=parameter_selection_list

decreased or ceases altogether. It appears that 2009 is the second year with a decreased number of inflorescences reported for all three populations; should this trend continue, the threat of a lack of genetic diversity within and among populations may be elevated.

Goals: Three 5-year goals are identified for JMV:

- Maintain the three extant populations.
- Further safeguard the species against extinction by expanding its distribution.
- Develop an effective long-term recovery strategy for the species.

Measures:

1. Reduction of invasive plants at existing sites to the point where herbicide treatments are needed every 2 to 3 years as opposed to yearly. This will reduce the potential for researcher disturbance/trampling effects.
2. Establishment of one additional population located up- or downriver of the existing populations, beyond the 15-mile stretch of the Connecticut River where the existing three populations are found. Within the 5-year time frame, this population should show signs of becoming self-sustaining, e.g., positive survival rates and reproductive success.
3. Maintenance of a sufficient number of plants at each site to ensure genetic diversity within and among populations.
4. Production of a revised recovery plan.

Actions and Costs:

Measure 1. Reduction of invasive plants at existing sites to the point where herbicide treatments are needed every 2 to 3 years as opposed to yearly.

Efforts to develop the most successful methodology to remove and/or contain the spread of native and non-native species and restore JMV habitat have been ongoing since 1998 (Brumback 2003, 2004; New Hampshire Natural Heritage Bureau 2003). Informal management plans have been developed for each site and the determination of when to implement management actions, including herbicide treatments or physically removing plants, is made at an annual JMV planning meeting. Complete eradication of invasive plant species, including black swallowwort, purple loosestrife, cypress spurge, and shrubby honeysuckle, is impossible. The goal of invasive plant management at this time is to reduce invasives to a low level using the minimal amount of treatment. Objectives are two-fold: (1) Provide a sufficient amount of invasive plant-free habitat for JMV seedlings, and (2) reduce the potential for researcher disturbance and trampling of seedlings or adult plants.

Actions:

- Continue monitoring and managing invasive plants. Develop site-specific invasive species management plans.

- Implement herbicide applications according to management plans.

Estimated costs: Annual costs to implement Measure 2 are primarily for monitoring and managing invasive plants, including the hiring of a licensed herbicide applicator. Additional costs result from staff time to obtain the necessary permits for the herbicide application. The States of Vermont and New Hampshire annually request approximately $8,000 to implement invasive plant management at all three populations.

Measure 2. Establishment of one additional population located up- or downriver of the existing populations.

JMV is a narrow endemic plant once documented from five locations along a 15-mile stretch of the Connecticut River of Vermont and New Hampshire. At the time JMV was listed, three extant sites remained: Hartland Ledges in Vermont, and Sumner Falls and Jarvis Hill in New Hampshire. Although extensive surveys of potential and historic habitat along the Connecticut River were conducted between 1985 and 2007, no additional sites were found. JMV range remains restricted to the three extant sites, all of which are very small (each less than an acre in size). The recovery objective states that seven additional populations should be located or established prior to delisting the species. Based on past surveys, the likelihood of finding additional populations is virtually nil; therefore, establishing new populations is the only option. In 2009, a potentially suitable location in New Hampshire on State-owned land was identified. A pilot study to transplant a small number of seedlings to the site was initiated in the summer of 2009. It is anticipated that annual seedling transplants will be required for a number of years, as well as intensive management (irrigation, weeding, possibly invasive plant removal) in order to successfully establish a fourth population. In the interim, additional surveys will be undertaken to identify other potential introduction sites.

Actions:

- Identify one or more potential introduction sites, obtain landowner permission, and transplant seedlings. Develop methodology to enhance seedling survival.
- Continue seed bank and germination trials. Continue a common garden experiment to determine if there are differences in seed germination rates and seedling survival between the three populations. Outcomes from this experiment may identify the best seed source for the establishment of future populations.

Estimated costs: Primary costs will be a contract with a qualified entity (e.g., the New England Wild Flower Society [NEWFS] or another botanical organization with similar experience) to continue and/or expand introduction efforts initiated in 2009. Estimated costs (based on a 2009 contract) for seed germination, seedling propagation and transplanting, and site management are anticipated to range between $13,000 to $15,000 per year (depending upon whether additional equipment or site visits are needed or whether a second site can be established). Approximately $65,000 to

$75,000 is needed over the life of this plan based on 2009 cost estimates. The true cost may be higher if NEWFS is unable to conduct the work and another qualified entity is contracted; another contractor will not have access to the plant material that NEWFS has maintained and may need to collect and store seed as well as grow plant stock for introductions, requiring additional funds.

Measure 3. Maintenance of a sufficient number of plants at each site to ensure genetic diversity within and among populations.

Two of the three populations of JMV are extremely small and may be vulnerable to inbreeding depression and loss of heterozygosity (Farnsworth 2008). Farnsworth (2008) observed that inflorescences produced by JMV plants at Hartland Ledges declined over the last 10 years, thus the population may be vulnerable to a genetic bottleneck as indicated by the apparent decline in reproduction. Moreover, it appears that 2009 is the second year that low numbers of inflorescences were observed, possibly indicating a decline in the overall population.

Actions:

- Continue surveys and monitoring of JMV plants and seedlings to evaluate the status of existing populations. Determine and compare intrinsic rates of population increase at all sites.
- Augment existing populations using seedlings from germination trials when necessary. Develop plan to determine if/when augmentation is necessary.

Estimated costs: Annual costs to implement Measure 3 are primarily for monitoring JMV seedlings and adult plants. Monitoring may be a census of inflorescences or a complete count of the population. Additional costs may be incorporated if augmentation is required at the two smaller sites (Hartland Ledges and Sumner Falls/Plainfield). The States of Vermont and New Hampshire annually request approximately $2,000 - $3,000 to implement JMV monitoring at all three populations (excluding augmentation). A minimum of $12,000 for the life of this plan is estimated for monitoring JMV and periodic population augmentation of the smaller populations.

Measure 4. Produce a revised recovery plan.

The 5-year review identified the need to revise the current recovery plan, as the recovery criteria were unattainable and threats were outdated, e.g., invasive plants and climate change were not identified threats. A draft recovery plan (Farnsworth and Harvey 2004) and a draft monitoring plan and recovery update (Farnsworth 2008) were prepared for the New Hampshire Natural Heritage Bureau. These documents will facilitate the completion of the revision.

Actions:

- Set a target date and undertake completion of the recovery plan revision, using Farnsworth and Harvey (2004), Farnsworth (2008), and the 2009 5-year review as baseline documents.

Estimated costs: Revising the recovery plan will be accomplished primarily using the New England Field Office (NEFO) base funding. At the R5 bio-day rate of $728 and assuming that 5 to 10 percent of one biologist's time would be needed over a 6-month time frame (i.e., 128 working days), the in-house cost is estimated at approximately $4,600 - $9,300. Also assuming that at least one meeting would be needed to share information and ideas for the recovery plan, the total cost of the recovery plan revision is estimated at roughly $5,000 to $10,000.

Roles and Responsibilities:

Following are the roles and responsibilities of the Endangered Species Act programs, other U. S. Fish and Wildlife Service (Service) programs, and other agencies and organizations in implementing this action plan.

A small coalition of State and Federal agencies and one non-Governmental organization has consistently led recovery implementation of JMV. State agencies responsible for plant conservation in New Hampshire (New Hampshire Natural Heritage Bureau) and Vermont (Non-game and Natural Heritage Program, Vermont Department of Fish and Wildlife) and the Service's New England Field Office annually review the species' status and determine which recovery actions to implement the following field season. NEWFS is a valuable partner in the recovery efforts, lending its expertise in seed collection and banking, and propagating seedlings for augmentation and introduction activities. NEWFS has been funded annually to manage invasive plants because of their staff's familiarity with JMV life history and populations, as well as invasive plant management. NEWFS is also periodically funded to grow seedlings for augmentation or introduction, provides in-kind services including seed banking and germination tests, as well as technical assistance and advice in transplanting and maintaining transplanted seedlings during augmentation and introduction activities.

The Silvio O. Conte National Fish and Wildlife Refuge has identified at least one area for possible acquisition and has been negotiating with a cooperative landowner for a number of years.

Literature Cited:

Brumback, W. 2003. Evaluation of invasive plant treatments at two sites of *Astragalus robbinsii* var. *jesupii* (Jesup's milk-vetch). Report prepared for the U.S. Fish and Wildlife Service, Concord, New Hampshire. 5 pp.

Brumback, W. 2004. Recovery activities with *Astragalus robbinsii* var. *jesupii* in 2004. Report prepared for the U.S. Fish and Wildlife Service, Concord, New Hampshire. 11 pp.

Cairns S. 2007. 2006 *Astragalus robbinsii* var. *jesupii* (Jesup's milk-vetch) recovery activities in New Hampshire. Report submitted to the U.S. Fish and Wildlife Service, Hadley, Massachusetts.

Farnsworth, E. 2008. Jesup's milk-vetch (*Astragalus robbinsii* var. *jesupii*) rare plant monitoring and recovery update and introduction plan. Prepared for: The New Hampshire Natural Heritage Bureau, Concord, New Hampshire, and the U.S. Fish and Wildlife Service, Hadley, Massachusetts. 48 pp.

Farnsworth, E and L. Harvey. 2004. Jesup's milk-vetch (*Astragalus robbinsii* var. *jesupii*) recovery plan draft update/revision. Prepared for The New Hampshire Natural Heritage Bureau, Concord, New Hampshire, and the U.S. Fish and Wildlife Service, Hadley, Massachusetts. 51 pp.

New Hampshire Natural Heritage Bureau. 2003. 2002 *Astragalus robbinsii* var. *jesupii* (Jesup's milk-vetch) recovery activities in New Hampshire. Report submitted to the U.S. Fish and Wildlife Service. Concord, New Hampshire.